FLYBOX®

CR - RPM / Timer for rotor

Revision#2.0, 6/11/2014
For firmware version 1.3u

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Thank you for purchasing a Flybox® product. We hope it fully satisfy you and makes your flights pleasant and secure.
Developing CR, our intent was to create a compact and lightweight tachometer, easy to install and quick to consult.

SYMBOLS USED IN THE MANUAL

NOTE: Used to highlight important informations.

CAUTION: Used to warn the user and indicate a potentially hazardous situation or improper use of the product.

WARNING: Used to indicate a dangerous situation that can cause personal injury or death if the instruction is disregarded.

NOTE: Keep this manual in the aircraft.
This document must accompany the instrument in the event of change of ownership.

NOTE: This device is intended for installation onto non type certified aircraft only, because it has no aviation certifications. Refer to your local aviation authorities to check if this device may be installed in your aircraft.

CAUTION: Read entirely this manual before installing the instrument in your aircraft, and follow the installation and operating instructions described here.

CAUTION: Using this instrument over the maximum allowable ranges can cause malfunction or wrong indications.

CAUTION: Microel s.r.l. reserves the right to change or improve its products. Information in this document is subject to changes without notice.

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SECTION 1

1.1 MECHANICAL INSTALLATION

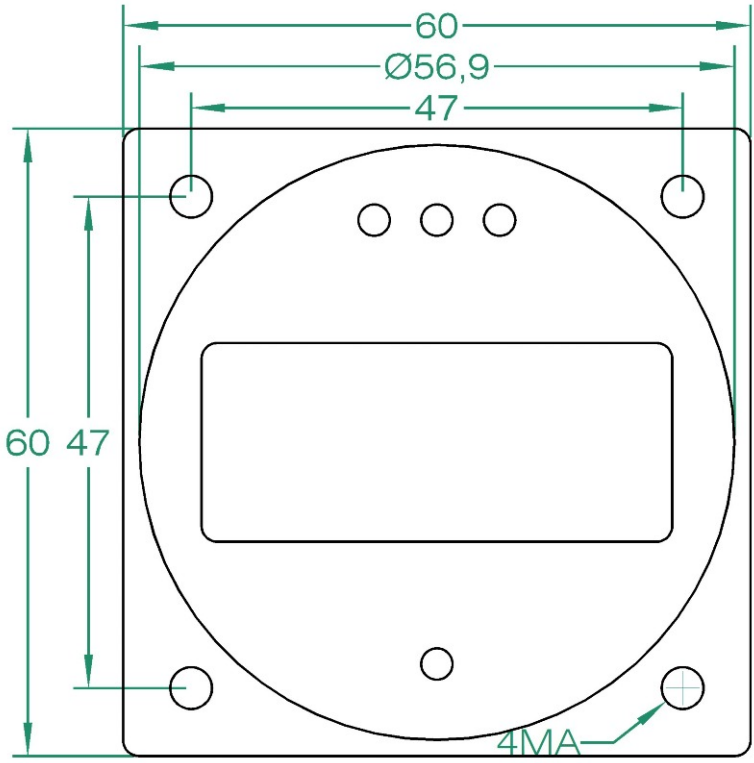
1) CR fits in a standard 2 1/4” (57 mm) cutouts.

2) Avoid placing in hot locations (for example near heater vents).

3) Find a location where the display will always be completely visible.

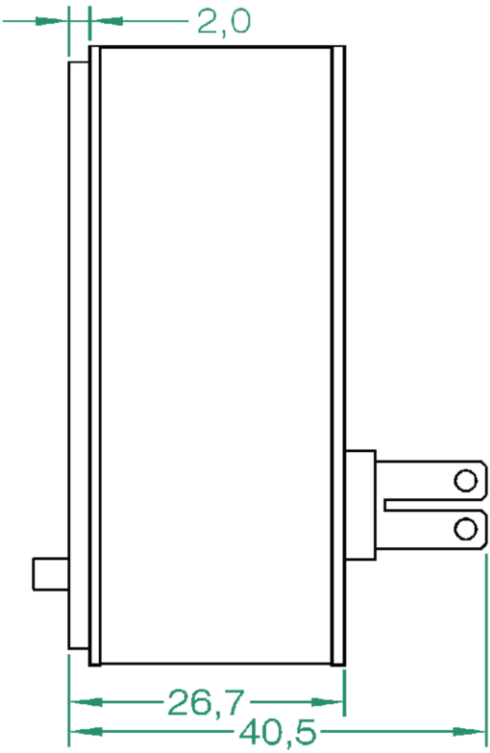
SECTION 2

2.1 DIMENSIONS



Front view

Dimensions in millimeters



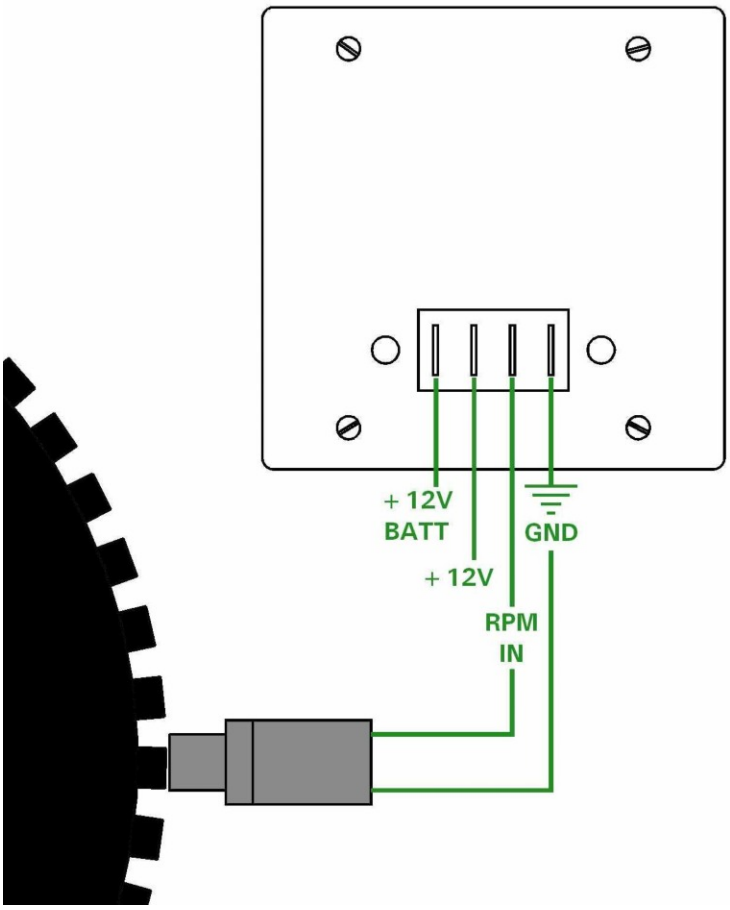
Side view

Dimensions in millimeters

SECTION 3

3.1 ELECTRICAL INSTALLATION

On the back of the instrument there's a four-pole connector.



Description of connections:

+12 BATT: power lead, can be connected to an auxiliary backup battery, if available.

+12 V: power lead, connects to 12 Volt main line.

RPM IN: RPM signal input from rotor pickup.

GND: Ground lead

NOTE:

- Use the pick-up available at RS components with the code 285-756.

- To have a correct signal at low RPM the pickup must be placed near the gear wheel (0.1~0.2 mm).

- Default number of tooths stored in CR is 119; if you use a different gear wheel you must change this parameter (see chapter 7.1 “Programming”).

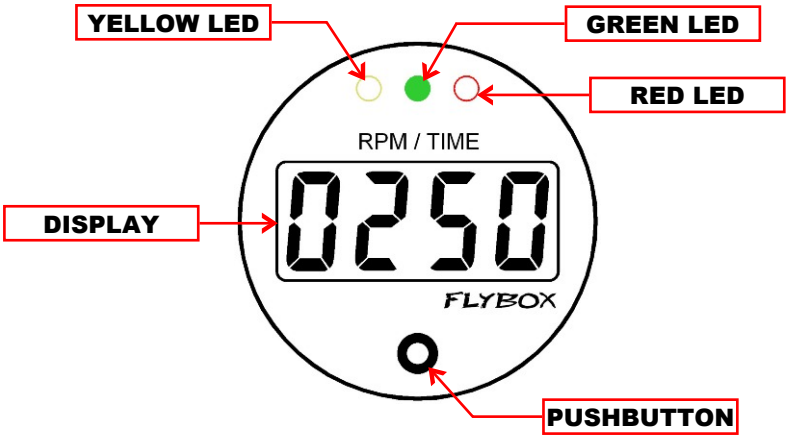
- The number of tooths of the gear wheel must be choosed depending on the RPM range to be measured, considering this proportion between number of tooth and RPM range:
120 tooth → 10~1000 RPM
60 tooth → 20~2000 RPM
30 tooth → 40~4000 RPM
etc…

- Insert a 1A circuit breaker or fuse to the power lead (+12V wire).

CAUTION: Voltage peaks on the supply line that exceeds the operating limits can damage the device.

SECTION 4

4.1 PANEL INDICATOR AND COMMANDS



- Symbols used in the manual:

LED IS OFF

LED IS ON

LED IS FLASHING

SECTION 5

5.1 USE DURING FLIGHT

After power-on the display briefly shows the software version, then it will be ready to work.

when the rotor is stopped the display shows "0000" and the three LEDs are off; when the rotor is running, the display shows the RPM and at the same time one of the LEDs turns on indicating the rotation range of the rotor.

YELLOW ZONE	GREEN ZONE	RED ZONE
80~280 RPM	280~480 RPM	> 480 RPM

FLIGHT TIMER:

The flight timer starts automatically when the rotor meets or exceeds 280 RPM for 30 seconds (green zone) and it stops automatically below 30 RPM.

Click on the button to view the duration of the current flight (the time is shown in hours and minutes); click again to return to the RPM mode (or wait 5 seconds). The maximum measurable value is 9h59min.

During the flight it is possible to reset the timer by pressing the button for 3 seconds, until the display shows “Clrd”.

SECTION 6

6.1 USE AFTER THE FLIGHT

After the flight, seven different readouts become available:

1) **Last flight timer**

2) **Max RPM reached by the rotor during the last flight**

3) **Total accumulated rotor time**

4) **Total accumulated time in “green” zone**

5) **Total accumulated time in “yellow” zone**

6) **Total accumulated time in “red” zone**

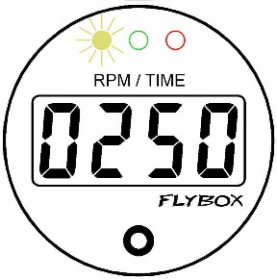
7) **Max RPM ever reached by the rotor**

NOTE:

- After 10 seconds of inactivity the display automatically return to the actual RPM screen.

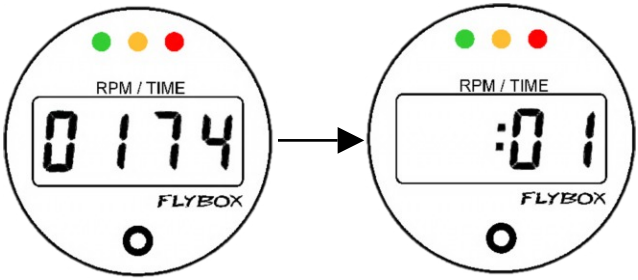
To scroll through the various functions click on the button; the following describes in sequence the various functions displayed:

1- The Flight timer stores in memory the last flight's time in hours and minutes; it will reset automatically at the next takeoff. It's available also during the flight, showing the current flight time.



2- Maximum peak RPM reached by the rotor in the last flight; it will reset automatically at the next takeoff.

All the following functions show the time in the format HHHH:MM (thousands of hours and minutes); the display shows alternatively the hours and then the minutes, for example:



means 174 hours and 1 minute.

3- Total time accumulated by the rotor.

4- Total accumulated time in “green” zone.

5- Total accumulated time in “yellow” zone.

6- Total accumulated time in “red” zone.

7- Maximum peak RPM reached by the rotor during its life.

SECTION 7

7.1 PROGRAMMING

The programming mode allows you to:

- Reset or modify the total accumulated rotor time (modify is useful when installing on a used rotor).

- Reset the total accumulated time in “yellow” and “red” zone.

- Reset the maximum peak RPM

- Set the number of tooth of the gear

To enter the programming mode:

With the instrument turned off press and hold the button, then power on the instrument and wait 5 seconds until the display shows the word “ProG”, that continuously alternates with the first parameter to be programmed.

The programmable parameters are, in order, the following:

- Green zone hour meter (green led on)

Press the button again for 3 seconds until the display shows the first digit of the number flashing;
click on the button to increase the value by one unit or hold the button to go to the next digit, and repeat this step for all four digits.
When the insertion is completed the value is stored in memory and the display confirms the storing showing the word “MEMO”.

- Yellow zone hour meter (yellow led on)

This parameter can only be cleared (reset to zero):
press and hold the button until the display shows “Clrd” or just click the button to jump to the next value without clearing.

- Red zone hour meter (red led on)

This parameter can only be cleared (reset to zero):
press and hold the button until the display shows “Clrd” or just click the button to jump to the next value without clearing.

- Max RPM ever (all 3 led flashing)

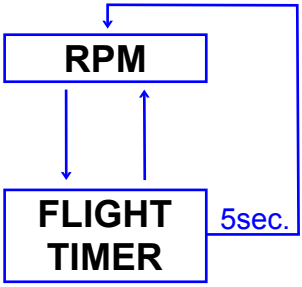
This parameter can only be cleared (reset to zero):
press and hold the button until the display shows “Clrd” or just click the button to jump to the next value without clearing.

- Number of tooths of the gear wheel (“toot” showed on display)

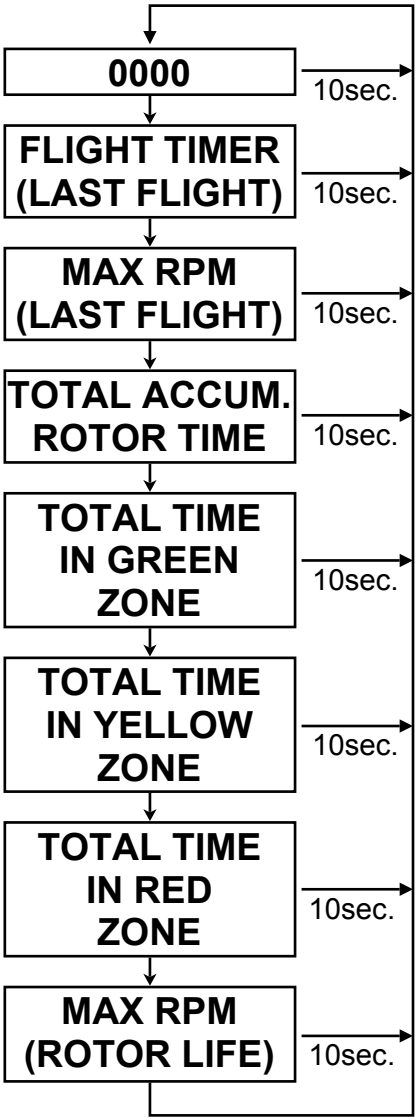
Press and hold the button for 3 seconds until the first digit become flashing; click on the button to increase the value by one unit or hold the button to go to the next digit, and repeat this step for all four digits.
When the insertion is completed the value is stored in memory and the display confirms the storing showing the word “MEMO”.

To exit the programming mode turn off the power and wait a few seconds before turning on again.

USE DURING FLIGHT (ROTOR ON)



USE AFTER FLIGHT (ROTOR OFF)



SECTION 8

8.1 TECHNICAL SPECIFICATIONS

- **Case dimensions:** 60 x 60 x 40.5 mm.
- **Weight:** 103 g.
- **Power requirements:** 10 ~ 30 V / 40 mA.
- **Measurable frequency range:** 20 ~ 2000 Hz.
- **Resolution:** 10 RPM.
- **Accuracy:** 0.02%.
- **Operating temperature range:** -20 ~ +70 °C.
- **Relative humidity:** 10% ~ 90% (without condensation).

WARRANTY:

This product is warranted to be free from defects for a period of 12 months from the user invoice date.

The warranty only covers manufacturer defects; and shall not apply to a product that has been improperly installed, misused or incorrect maintenance, repaired or altered by non-qualified person.

Date	Version	Description
03/2010	1.2	First release
11/2014	2.0	Layout update

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